

TUNNELLING IN ESAKI JUNCTIONS

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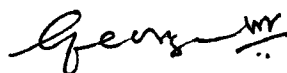
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PREFACE

The invention of tunnel diode in 1958 by Leo Esaki heralded a period of intense activity by both physicists and engineers who sought to understand and realise the potentialities of this new semiconductor device. At first the potentialities appeared limitless, but gradually the various limitations of the device were exposed. Among the several disciplines where the tunnel diode has found a permanent place are the fields of electronic computers (where it is used in conjunction with transistors to provide fast switching), the heavily-doped semiconductors etc. The work described in the thesis further widens the frontier of achievements of tunnel diodes as it illustrates that the understanding of the phenomenon of tunnelling through them has led to a modification in our ideas of field emission.

I am deeply indebted to Dr. D.K. Roy for his constant encouragement and constructive criticism and for providing a stimulating and challenging environment in which I have been welcomed, inspired, and abundantly assisted. He has helped me in carrying out this work in the hope that it would prove to be of some use to those who will further advance our knowledge and understanding along this small but fascinating frontier of physics. I am deeply grateful to many of my teachers and colleagues at Indian Institute of Technology, Delhi; without their help this work could not have been completed. I wish especially to thank Mr. M.P. Joseph for his assistance in many ways, including the typing of the entire thesis. The financial assistance by C.S.I.R.(India) is gratefully acknowledged.



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